Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the Commission's Rules to Establish Part 27, the Wireless Communications Service ("WCS")	)	GN Docket No. 96-228

REPORT AND ORDER

Adopted: February 19, 1997 **Released:** February 19, 1997

By the Commission: Commissioners Ness and Chong issuing separate statements.

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I. INTRODUCTION AND EXECUTIVE SUMMARY

1. In this *Report and Order*, we fulfill the Congressional mandate expressed in Section 3001 of the Omnibus Consolidated Appropriations Act, 1997 ("Appropriations Act") to reallocate and assign the use of the frequencies at 2305-2320 and 2345-2360 megahertz.[1] We consider the proposals set forth in the *Notice of Proposed Rule Making ("NPRM")*[2] in GN Docket No. 96-228 concerning amendment of the Commission's rules to establish the Wireless Communications Service ("WCS"). We received 55 comments and 38 reply

[1] Omnibus Consolidated Appropriations Act, 1997, P.L. 104-208, 110 Stat. 3009 (1996).

[2] *Amendment of the Commission's Rules To Establish Part 27, the Wireless Communications Service ("WCS")*, GN Docket No. 96-228, *Notice of Proposed Rule Making*, FCC 96-441, 61 FR 59048 (rel. November 17, 1996) (*"NPRM"*).

comments in this proceeding.[3] Upon consideration of the extensive record in this proceeding, we take the following actions to implement the directives of the Appropriations Act.

2. We reallocate 2305-2320 and 2345-2360 MHz (2.3 GHz band) and give WCS licensees flexibility to provide wireless services that are consistent with the allocation table and associated international agreements. Any service contained in Part 2 of the Commission's Rules for the subject band will be permitted within a licensee's assigned spectrum and geographic area(s).[4]

3. However, because the reallocated WCS spectrum is located on both sides of the spectrum allocated for the satellite Digital Audio Radio Service ("satellite DARS"), we believe that there is a substantial risk that the out-of-band emission limits we are adopting -- which we believe are necessary to protect prospective satellite DARS licensees from interference from WCS operations -- will, at least in the foreseeable future, make mobile operations in the WCS spectrum technologically infeasible. We will require that all emissions from fixed transmitters be attenuated below the maximum spectral power density (p) by at least 80 + 10 log (p) dBW, and that all emissions from mobile transmitters be attenuated below p by at least 110 + 10 log (p) dBW within the 2320-2345 MHz band. In addition, we will require certain WCS transmitters and devices to routinely perform environmental evaluations with respect to our RF safety limits.

4. We will award two 10 MHz WCS licenses for each of 52 Major Economic Areas (MEAs), and two 5 MHz WCS license for each of 12 Regional Economic Area Groupings (REAGs). All WCS licenses will be awarded by means of a simultaneous, multiple-round, electronic auction. In addition, with respect to public safety communications needs, we note here our expectation that additional spectrum will be made available for public safety use as a result of other proceedings. We also note that new sources of funding for public safety are needed, and believe that approaches such as that taken in recent legislation introduced in Congress would substantially aid public safety agencies.

5. We impose no eligibility restrictions for WCS spectrum, with the exception of the foreign ownership restrictions set forth in Section 310 of the Communications Act, to the

[3] A list of the commenters and the reply commenters, with abbreviations used herein, can be found in Appendix A hereto. The Satellite Industry Association ("SIA") and the National Association of Black Owned Broadcasters ("NABOB") each filed a motion for acceptance of late filing. We hereby grant their motions, and consider their submissions as informal comments. In addition, Sun Microsystems, Inc. ("Sun Microsystems") filed its comments after the applicable deadline. We also will consider its submission as informal comments.

[4] For the 2.3 GHz band, the allocated services in Part 2 are Fixed, Mobile, Radiolocation and Broadcasting-Satellite (sound).

extent the restrictions are applicable to the particular service in question. We will not consider WCS spectrum holdings for purposes of the CMRS spectrum cap. Consistent with the Commission's recent decision concerning partitioning and disaggregation by CMRS licensees, we will permit WCS licensees to partition their service areas into smaller geographic service areas and to disaggregate their spectrum into smaller blocks without limitation.

6. We will grant WCS licenses for a term of 10 years; and, they will carry a renewal expectancy similar to that afforded PCS and cellular licensees. Each WCS licensee will be required to provide substantial service in its service area within 10 years.

7. Winning bidders for WCS licenses will designate in their long-form applications the type(s) of WCS service(s) they will provide. Their regulatory treatment will depend on these designations. WCS licensees that provide satellite Digital Audio Radio Service ("satellite DARS") services will be governed by the rules to be adopted in IB Docket No. 95-91.

8. With some exceptions, we adopt the competitive bidding rules set forth in Part 1 of the Commission's Rules for the WCS auction. We will make available on all WCS licenses bidding credits of 25 percent and 35 percent for bidders that qualify as small businesses and very small businesses, respectively, using the revenue standards employed in broadband PCS. We also adopt unjust enrichment restrictions on the transfer of licenses acquired by small businesses similar to those set forth in 47 C.F.R. § 24.839(d).

9. The Commission makes no representations or warranties about the use of this spectrum for particular services. Applicants should be aware that an FCC auction represents an opportunity to become an FCC licensee in this service, subject to certain conditions and regulations. An FCC auction does not constitute an endorsement by the FCC of any particular services, technologies or products, nor does an FCC license constitute a guarantee of business success. Applicants should perform their individual due diligence before proceeding as they would with any new business venture.

II. BACKGROUND

A. Appropriations Act

10. The Appropriations Act directed the Commission to "reallocate the use of frequencies at 2305-2320 megahertz and 2345-2360 megahertz to wireless services that are consistent with international agreements concerning spectrum allocations," to "assign the use of such frequencies by competitive bidding pursuant to Section 309(j) of the Communications

Act of 1934."[5] In making these bands of frequencies available for competitive bidding, we were directed to "seek to promote the most efficient use of the spectrum" and "take into account the needs of public safety radio services."[6] The Appropriations Act also requires the Commission to commence the competitive bidding for the assignment of the frequencies made available by this action no later than April 15, 1997, and to conduct the competitive bidding for these frequencies in a manner that ensures that all proceeds of the bidding are deposited in accordance with Section 309(j)(8) of the Communications Act not later than September 30, 1997.[7] In order to make this spectrum available for licensing quickly, the Appropriations Act grants the Commission permission to use expedited administrative procedures. Specifically, the Appropriations Act states that rules governing the frequencies made available by this proceeding will be effective immediately upon publication in the Federal Register.[8] The Appropriations Act further provides that 5 U.S.C. Chapter 6 (regulatory flexibility analysis requirements) and 44 U.S.C. §§ 3507 and 3512 (information collection requirements) will not apply to the rules and competitive bidding procedures governing the frequencies at issue here. Further, the statute provides that the Commission may grant a license application for these frequencies no earlier than seven days following issuance of a public notice of the acceptance for filing of the application or major amendment thereto, despite the 30-day public notice provisions of 47 U.S.C. § 309(b). Finally, the statute provides that the Commission may specify a period that is not less than five days following issuance of such public notice for the filing of petitions to deny a license application for these frequencies, despite the 30-day public notice provisions of 47 U.S.C. § 309(d)(1).

B. Existing Spectrum Allocations and Use

1. International

11. We note, as a general matter, that the member nations of the International Telecommunication Union ("ITU") have adopted radio service allocations that apply to use of

[5] *See* 47 U.S.C. § 309(j).

[6] Appropriations Act, Sections 3001(a), (b).

[7] Appropriations Act, Section 3001(d).

[8] The Appropriations Act makes inapplicable to this rule making proceeding the contrary requirements of 5 U.S.C. § 553(d) (Administrative Procedure Act provision that a substantive rule must generally be published in the Federal Register at least 30 days before its effective date) and 5 U.S.C. §§ 801(a)(3) and 806(a) (Contract With America Advancement Act provisions).

the frequencies under consideration in this proceeding in the United States.[9] The 2300-2450 MHz band is allocated to fixed, mobile, and radiolocation services on a primary basis.[10] In addition, the 2310-2360 MHz band is allocated to broadcasting-satellite service (sound) and complementary terrestrial sound broadcasting service on a primary basis in the United States, with this use being limited to digital audio broadcasting.[11] The 2300-2450 MHz band is also allocated to the Amateur Radio Service on a secondary basis.[12]

2. Domestic

12. In the United States, the 2300-2310 MHz band was made available for exclusive non-Government use as of August 10, 1995.[13] Currently, the only non-Government use of

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[9] *See* ITU *Final Acts of the World Radiocommunication Conference (WRC-95), Geneva, 1995.*

[10] The aeronautical mobile service for telemetry, however, has priority over other uses by the mobile service in the 2300-2390 MHz band in the United States and the 2300-2483.5 MHz band in Canada. *See* international footnote S5.394. We also note that the ITU is transitioning to new Simplified Radio Regulations, which use the "S" numbering scheme for international footnotes. In anticipation of the ITU's ultimate conversion to the Simplified Radio Regulations, we are employing the new "S" numbering scheme for international footnotes adopted in this proceeding. The Commission lists the international footnotes immediately following the Table of Frequency Allocations in Section 2.106 of the Rules. *See* 47 C.F.R. § 2.106. Until such time as this list is revised in its entirety to comport with the new "S" numbering scheme, those international footnotes that are amended to the new scheme in individual proceedings will be listed in Section 2.106 immediately prior to the list of unamended footnotes employing the old numbering scheme.

[11] *See* 47 C.F.R. § 2.106, international footnote S5.393 (formerly 750B) and 47 C.F.R. § 2.106, United States footnote US327. This broadcasting-satellite allocation is also subject to the provisions of ITU Resolution 528. In addition, space stations of the broadcasting-satellite service in the 2310-2360 MHz band operating in accordance with No. S5.393 that may affect the services to which this band is allocated in other countries must be coordinated and notified in accordance with Resolution 33. Complementary terrestrial broadcasting stations are subject to bilateral coordination with neighboring countries prior to commencing their operations. *See* 47 C.F.R. § 2.106, international footnote S5.396 (formerly 751B).

[12] The Amateur Radio Service is a radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest. *See* 47 C.F.R. § 2.1.

[13] During the reallocation process, the National Telecommunications and Information Administration ("NTIA") recommended the following constraints: (1) the 2300-2310 MHz band must not be used for airborne or space-to-Earth links; (2) commercial operations at 2300-2310 MHz must be limited to less than one watt of power; (3) unwanted emission levels of commercial applications on any frequency below 2300 MHz must be attenuated below the mean power of the unmodulated carrier by 70 dB; and (4) operation of commercial devices in the 2300-2310 MHz band must not be permitted on Ft. Irwin, California. *See Spectrum Reallocation Final Report*, U.S. Department of Commerce, February 1995, at pages 4-15 and 4-16.

this band is by the Amateur Radio Service, which is on a secondary basis.[14] The 2310-2360 MHz band was recently reallocated to non-Government broadcasting-satellite service on a primary basis.[15] The only broadcasting-satellite service permitted in the United States under this allocation is digital audio broadcasting delivered by satellite, commonly known as satellite DARS.[16] In the action allocating this spectrum to satellite DARS, we stated that it would be necessary to accommodate the aeronautical telemetry services now operating in the 2310-2360 MHz band in the 2360-2390 MHz band.[17] The aeronautical telemetry community supported this re-accommodation. Continued use of the 2310-2360 MHz band by aeronautical telemetry and radiolocation users is on a secondary basis. The 2320-2345 MHz band will continue to be available for the Government and non-Government mobile service and Government radiolocation service on a primary basis until such time as a broadcasting-satellite (sound) service has been brought into use in such a manner as to affect or be affected by the mobile and radiolocation services.[18]

III. DISCUSSION

A. Licensing Plan for WCS

1. Permitted Services

13. *Background.* In the *NPRM*, we concluded that the Appropriations Act's reallocation directive means that the Commission may allocate the 2305-2320 and 2345-2360 MHz bands to any or all radio services contained in the International Table of Frequency Allocations applicable to the United States. We proposed to allocate this spectrum to the fixed, mobile, and radiolocation services on a primary basis, which are all the services authorized on a primary basis for these entire bands in the International Table. We also proposed to retain the current primary audio broadcasting-satellite allocation that exists in 45

[14] *See* 47 C.F.R. § 97.301. The 2300-2310 MHz band is available for use by amateur stations having a control operator who has been granted any class of amateur operator license, except Novice.

[15] *See Amendment of the Commission's Rules with Respect to the Establishment and Regulation of New Digital Audio Radio Services*, GN Docket No. 90-357, *Report and Order*, 10 FCC Rcd 2310 (1995).

[16] We are considering service, licensing and technical rules for satellite DARS in IB Docket No. 95-91. *See Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band*, IB Docket No. 95-91, *Notice of Proposed Rule Making*, 11 FCC Rcd 1 (1996) ("*Satellite DARS NPRM*").

[17] *See* n. 13, *supra.*

[18] *See* Appendix B, footnote US328.

of the 50 MHz of these bands (2310-2320 and 2345-2360 MHz). We did not propose to change the Amateur Radio Service secondary allocation of the 2300-2310 MHz band, nor the authorization for the 2310-2360 MHz band to be used on a secondary basis by aeronautical telemetry operations.

14. We noted that in our Satellite DARS *NPRM* we had requested comment on whether we should delay issuing licenses for DARS in the 2310-2320 MHz portion of the DARS allocated spectrum due to the number and type of Canadian fixed service facilities in that band. We also noted that in February 1996, we had informed DARS applicants that previously unknown additional Canadian operations existed in the 2310-2360 MHz band that particularly impacted potential use of the 2345-2360 MHz portion of the band for DARS.[19] Accordingly, we requested comment on the feasibility of satellite DARS in parts of the 2305-2320 and 2345-2360 MHz bands.

15. *Comments.* We received extensive comment on permitting WCS licensees, subject to proposed specific technical rules, to provide any of the fixed, mobile, radiolocation, or satellite audio services permitted by the International Table. Those commenters who supported this generally argue that: (1) a market-based allocation will enlarge the universe of potential bidders and permit the spectrum to be valued on the basis of the various services;[20] (2) limiting the scope of services that could be provided in the WCS spectrum might unduly limit the number and type of services that could be provided;[21] (3) such an approach is consistent with our treatment of CMRS providers;[22] and (4) there is no compelling record support for any single use.[23]

16. Several of the commenters supporting our proposal also contend that an allocation that permits flexible domestic use of this spectrum will help to ensure that new technologies are developed and deployed. For example, Bellcore states that it is technologically and economically feasible to design and deploy on this band a wireless system tailored to provide

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[19] *See NPRM* at n. 20.

[20] *See, e.g.,* ALLTEL Comments at 2; CPI Comments at 1-7.

[21] CPI Comments at 7.

[22] *See, e.g.,* PRTC Comments at 2-3, citing *Amendment of the Commission's Rules to Permit Flexible Service Offerings in the Commercial Mobile Radio Services*, WT Docket No. 96-6, *First Report and Order*, 11 FCC Rcd 8965, 8967 (rel. August 1, 1996) (CMRS licensees provided flexibility in choosing to offer fixed services on a co-primary basis with mobile services).

[23] *See, e.g.,* Comcast Reply Comments at 2.

portable Internet access over wide areas at data rates comparable to ISDN-type connection.[24] Because the technical characteristics of such a system would differ significantly from those for some other systems that might utilize this band (*e.g.*, PCS), Bellcore urges the Commission to neither restrict the services provided in this band nor dictate technical standards for operation beyond those required to avoid interference and protect the public health.[25] Similarly, Vanguard contends that because the Commission has proposed not to specify any particular use for this spectrum, WCS licensees should be permitted to provide any technically feasible service, rather than only those proposed services enumerated in the *NPRM*.[26]

17. A majority of commenters oppose our flexible use proposal. These commenters generally argue that: (1) unrestricted spectrum flexibility will harm the public interest because it would restrict competition, discourage innovation, and delay the provision of new services;[27] (2) lack of concrete guidance from the Commission as to the service offerings permitted on WCS spectrum will inhibit manufacturers' production of equipment necessary for new services and adversely affect the associated costs and arrival of such equipment to the marketplace;[28] (3) flexible use of this spectrum cuts against the growing need for worldwide standardized equipment allocations and would hinder manufacturers' efforts to look to the international marketplace for added demand for WCS-appropriate devices;[29] (4) uncertainty over the types of services to be offered by adjacent WCS licensees will adversely affect development of efficient spectrum utilization plans and make coordination between adjacent markets costly and complex, which ultimately may require extensive Commission adjudication where adjacent systems are incompatible;[30] and (5) the Commission must allocate the

[24] Bellcore Comments at 1-2.

[25] *Id.*

[26] Vanguard Comments at 3.

[27] ADC Comments at 13; AirTouch Comments at 2-3; PCIA Comments at 5; TIA Comments at 13, Harris Comments at 4 (supporting TIA); Omnipoint Reply Comments at 1-2; SBC Reply Comments at 2.

[28] Lucent Comments at 5; PCIA Comments at 5; TIA Comments at 13; Harris Comments at 4 (supporting TIA); ITA Comments at 7; Motorola Comments at 7; ADC Comments at 14-15; Primosphere Reply Comments at 10; ANS Reply Comments at 4; Nextel Reply Comments at 4-5; Mtel Reply Comments at 2-3; SBC Reply Comments at 2.

[29] ANS Reply Comments at 6.

[30] ADC Comments at 14; Omnipoint Reply Comments at 1-2; Primosphere Reply Comments at 10-11.

2305-2320 MHz and 2345-2360 MHz bands only to services that will not impede the implementation of satellite DARS or impair its usefulness or quality.[31]

18. In addition, six commenters contend that our proposal to permit WCS licensees to provide any fixed, mobile, radiolocation services, or satellite DARS is contrary to the Commission's statutory mandate, under Section 303 of the Communications Act, to allocate frequencies in the public interest.[32] These commenters argue that by permitting winning bidders to determine which type of service will be offered using the WCS spectrum, the Commission has impermissibly delegated to third parties the task of spectrum allocation.

19. In this connection, many commenters recommend that the Commission specify particular services for the WCS spectrum. Lucent cites the General Wireless Communications Service ("GWCS") as an example of a failed past attempt by the Commission to rely on the market to specify the initial use of a spectrum band, contending that, lacking a service definition, the development of GWCS has been neither rapid nor efficient.[33] CTIA asserts that the Commission should, at a minimum, provide a preliminary allocation for the band and permit flexibility after use of the band develops.[34] CTIA states that, subsequent to adequate initial allocation, flexible use has the benefits of minimizing government intervention in a fully competitive market and promoting the objectives of Section 309(j) of the Communications Act.[35] AirTouch states that the Commission should divide the WCS spectrum into bands and assign an exclusive use to each band.[36]

20. Some commenters argue that the WCS spectrum should be allocated for "specialized services," such as wireless cable and wireless and mobile data, including Internet access and e-mail (both for commercial use and for schools, libraries, and hospitals), for which there is developing consumer demand but little access to sufficient spectrum.[37] For

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[31] Primosphere Reply Comments at 2, 4-5, 9-10.

[32] TIA Comments at 2-3; Harris Comments at 3 and 4 (supporting TIA); ANS Comments at 5-6; CTIA Comments at 4-5; PrimeCo Comments at 6-9; NextWave Reply Comments at 1-2.

[33] Lucent Comments at 5.

[34] CTIA Comments at 4-5.

[35] *Id.* at 6-7.

[36] AirTouch Comments at 3.

[37] *See, e.g.*, BellSouth Comments at 3-4; ISA Comments at 1-2; Omnipoint Comments at 4-7 and Reply Comments at 2 (advocating wireless local loop and wireless Internet services); Pocket Comments at 2; Nortel Reply Comments at 6-7; Sprint PCS/Sprint Reply Comments at 3-5.

example, PCIA, TIA and USIPA recommend that the Commission allocate the WCS spectrum for interactive, high speed, broadband data services, such as wireless Internet access.[38] Similarly, CTIA suggests designating a portion of the WCS spectrum to provide schools and libraries with access to a wireless information network.[39] BellSouth states that such an approach would increase the overall competitive value and availability of wireless cable services as an alternative to incumbent wireline cable operations (the spectrum already allocated for this purpose being limited for technological reasons).[40]

21. Similarly, ADC recommends allocating the 2345-2360 MHz band solely for satellite DARS,[41] and the 2305-2320 MHz band for fixed terrestrial use.[42] Specifically, ADC believes that allocating the 2345-2360 MHz band for satellite DARS will ensure the realization of DARS. ADC also states that preclusion of DARS from the 2305-2320 MHz band will avoid concerns about potential interference with Canadian terrestrial facilities.[43] With regard to the 2305-2320 MHz band, ADC asserts that this portion of the spectrum would provide a necessary and effective wireless return path for interactive services provided by over-the-air video service providers such as broadcast and wireless cable system operators.[44] While ADC does not propose that the 2305-2320 MHz band be restricted to those applications, it does advocate that the allocation for the band be only for fixed terrestrial use.[45]

22. Some commenters argue that the WCS spectrum should be used only to offer new services.[46] For example, 21st Century states that the Commission should not permit fixed and mobile services to be provided using the WCS spectrum because sufficient spectrum already

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[38] PCIA Comments at 2 and Reply Comments at 2, 9; TIA Reply Comments at 11; USIPA Reply Comments at 1-4.

[39] CTIA Reply Comments at 6.

[40] BellSouth Comments at 3-4.

[41] ADC Comments at 3.

[42] *Id.* at 3, 6.

[43] *Id.* at 4, citing *Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band*, 11 FCC Rcd 1, 20-22 (1995).

[44] *Id.* at 3, 6.

[45] *Id.* at 6.

[46] *See, e.g.*, SBC Comments at 2.

exists for the provision of these services.[47] Rather, 21st Century believes that WCS spectrum should be used to offer "new" services, in particular radiolocation services and/or satellite DARS.[48] Primosphere recommends that the Commission seek additional comment on the suggestions for services for which there may be a public need, including interactive video, wireless fixed local loop, wireless Internet access, high-speed broadband data, and wireless cable.[49]

23. Other commenters argue that WCS licensees should not be permitted to provide CMRS,[50] contending that use of WCS spectrum to provide CMRS would be unfair to existing CMRS licensees because it will result in the devaluation of their licenses when they need additional capital to complete construction of their systems,[51] resulting in a shortage of operating capital and added difficulties in obtaining financing.[52] One commenter argues that these difficulties are more likely given that many current PCS licensees (particularly small businesses) are seen as having overpaid for their PCS licenses.[53] Similarly, some commenters argue that permitting flexible use of spectrum licensed on a nationwide basis would put existing CMRS providers at a competitive disadvantage.[54] Two commenters assert that the Federal Government previously has determined CMRS to already have been allocated sufficient spectrum and that, accordingly, no reasoned basis exists for making the 2.3 GHz

[47] 21st Century Comments at 1.

[48] *Id.*

[49] Primosphere Reply Comments at 12-13.

[50] *See, e.g.,* PrimeCo Comments at 4-6; Motorola Comments at 2; Pocket Comments at 2; Nextel Reply Comments at 3-7.

[51] PrimeCo Comments at 4-6; PCIA Comments at 6; SBC Comments at 1, 2; ADC Comments at 16-17; Nortel Reply Comments at 4-5.

[52] *See* PCIA Comments at 6; PrimeCo Comments at 6; Motorola Comments at 2; ADC Comments at 16-17. *See also* Dan Shea and Jason Myers, *Navigating Wireless Waters*, Telephony, Aug. 5, 1996. Relatedly, Primosphere asserts the need to promote the confidence of the public and the industry in the orderliness of the Commission's auction processes, and sees the release of additional spectrum for PCS-like service as contrary to that need. Primosphere Reply Comments at 13-14. On the other hand, UTC asserts that it is a well-established principle of communications policy that the Commission is to protect competition and not specific competitors. UTC Reply Comments at 3.

[53] ADC Comments at 16-17.

[54] PCIA Comments at 5-7; SBC Comments at 1-2; AirTouch Comments at 6 and n. 11.

band available to CMRS.[55] PCIA believes that permitting WCS licensees to offer CMRS represents an inefficient use of this spectrum.[56]

24. Finally, Primosphere and DSBC oppose our proposal to permit aeronautical telemetry operations to continue in the 2310-2320 and 2345-2360 MHz bands on a secondary basis. They argue that spectrum sharing between satellite DARS and aeronautical telemetry is not technically feasible.[57] AFTRCC, on the other hand, states that there is no basis for precluding secondary flight test use of the 2310-2320 and 2345-2360 MHz bands.[58] In addition, ARRL supports our proposal for continued secondary amateur use of the 2305-2310 MHz band, but suggests that the Commission afford amateurs "the interference protection and stability afforded by a primary allocation at 2300-2305 MHz."[59]

25. *Decision.* We conclude that under the totality of circumstances presented, the 2310-2320 and 2345-2360 MHz bands will be allocated on a primary basis for fixed, mobile,[60] radiolocation, and broadcasting-satellite (sound) services without further designations. The 2305-2310 MHz band will be allocated on a primary basis for fixed, mobile except aeronautical mobile, and radiolocation services.[61] WCS licensees themselves will determine the specific services they will provide within their assigned spectrum and

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[55] BellSouth Comments at 5-6; Primosphere Reply Comments at 11-12.

[56] PCIA Comments at 5.

[57] Primosphere Comments at 7; DSBC Reply Comments at 5. Primosphere also proposes that the aeronautical telemetry allocation at 2320-2345 MHz be deleted. This issue is outside the scope of this proceeding.

[58] AFTRCC Reply Comments at 3.

[59] ARRL Comments at 10-11. ARRL states that, while the most significant amateur use of the 2300-2310 MHz band is around 2304 MHz for weak-signal experimentation, there are significant, diverse amateur operations throughout the band, including FM simplex and repeater operations, and fixed links. ARRL argues that a fixed, mobile and radiolocation allocation in the 2305-2310 MHz band makes continued amateur operations distinctly problematic in metropolitan areas. We note that, on November 19, 1996, ARRL filed a Petition for Issuance of Further Notice of Proposed Rule Making in ET Docket No. 94-32, proposing that the secondary amateur service allocation at 2300-2305 MHz be upgraded from secondary to primary status.

[60] In keeping with our flexible use policy, we decline to adopt international footnote S5.394 domestically. Footnote S5.394 states, *inter alia*, that the use of the 2300-2390 MHz band by the aeronautical mobile service for telemetry has priority over other uses by the mobile service in the United States. *See* Appendix B.

[61] The 2305-2310 MHz band is different from the remainder of the WCS spectrum because the broadcasting-satellite (sound) service is not allocated in this band internationally and because of the need to protect an extremely sensitive Government operation in a nearby band. *See* Subsection III.D.7. for a discussion of this Government operation.

geographic areas. The services that can be provided, however, will be subject to specific technical rules we adopt *infra* to prevent interference to other services. We emphasize that with the current state of technology there is a substantial risk that these rules will severely limit, if not preclude, most mobile and mobile radiolocation uses. Fixed uses will be less severely affected, but still will require equipment that will meet technical standards higher than those used for similar purposes on comparable bands, and therefore may be more costly.

26. We believe that in this instance a flexible use allocation serves the public interest. Permitting a broad range of services to be provided on this spectrum will permit the development and deployment of new telecommunications services and products to consumers. Moreover, WCS licensees will not be constrained to a single use of this spectrum and, therefore, may offer a mix of services and technologies to their customers.

27. We recognize the concerns raised by commenters about the general application of flexible allocations, and it is our intent to address those concerns fully in future proceedings. In this regard, we emphasize that our decision in this instance to adopt a broadly defined service for this spectrum should not be interpreted as a finding on the merits of flexibility as general allocation policy or prejudging the merits of flexibility in any other proceeding before us. Rather, our decision here is based on the totality of the circumstances and facts particular to this proceeding, not the least of which is the short time mandated by Congress to bring this spectrum to auction. Importantly, in this particular instance the record does not convincingly demonstrate how this spectrum should be distributed among particular uses in a manner that would provide maximum benefit to the public. Specific services advocated by commenters span a wide range of potential uses, including interactive, high-speed, broadband data services, such as wireless Internet access; return links for interactive cable and broadcasting service; mobile data; satellite DARS; fixed terrestrial use; new and innovative services; radiolocation; educational applications; and wireless local loop. While individual commenters advocate specific allocations for one or more of these uses, we have no clear basis in the current record to prefer some uses over others.[62] Thus, limiting the use as some have suggested would risk precluding potentially beneficial services.

28. We find that allocating this spectrum for fixed, mobile, radiolocation, and audio broadcasting-satellite services is consistent with the international agreements governing this spectrum, the Appropriations Act, the Communications Act, and Commission precedent. We

[62] Unfortunately, we do not have time to develop a further record because we are under a statutory mandate to commence the competitive bidding for this spectrum no later than April 15, 1997. In any event, as noted above, we wish to emphasize that the Commission makes no representations or warranties about the use of this spectrum for particular services, and an FCC auction neither constitutes an endorsement by the FCC of any particular services, technologies or products, nor does an FCC license constitute a guarantee of business success. Applicants should perform their individual due diligence before proceeding as they would with any new business venture.

note that the Appropriations Act specifically directs the Commission to reallocate the WCS frequencies to "wireless services that are consistent with international agreements concerning spectrum allocations."[63] Nothing in this provision or its legislative history[64] restricts the Commission's authority to assign or allocate this spectrum to more than one permissible use. Additionally, our allocation to more than one service is consistent with the Commission's obligations under the Communications Act. Section 303 of the Communications Act does not restrict the Commission's discretion to prescribe the nature of the service to be rendered over radio frequencies or its authority to allocate frequencies to the various classes of stations or assign spectrum to stations for more than one permissible use.[65] With respect to allocation decisions, the courts have accorded "substantial deference" to Commission determinations.[66]

29. Commission precedent also supports the permissibility of allocating spectrum in a manner that allows for a broad range of uses.[67] We noted in the *NPRM* that the Commission took this approach in establishing GWCS in August of 1995, where we concluded that authorizing a wide variety of services bounded only by international allocations comported with our statutory authority and served the public interest by fostering the provision of a mix of services.[68] Because GWCS licenses have yet to be auctioned, the evidence regarding the benefits of having allocated that spectrum to all uses permitted by our international obligations is inconclusive.

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[63] *See* Appropriations Act, Section 3001(a)(1).

[64] *See* H.R. Rep. 104-863, 142 Cong. Rec. H11644-01 at H12016 (1996).

[65] We acknowledge that certain other sections of the Communications Act reflect Congress's expectation that the Commission would utilize some amount of spectrum for particular types of services. *See, e.g.*, 47 U.S.C. § 309(b) (referring to fixed point-to-point microwave stations, industrial radio positioning stations, and aeronautical stations); and 47 U.S.C § 319 (distinguishing between amateur stations, mobile stations, public coast stations, privately owned fixed microwave stations, common carrier stations, and broadcast stations). Nevertheless, these sections can not be read to limit the Commission's discretion to permit the use of some spectrum for more broadly defined services.

[66] *See National Association of Regulatory Utilities Commissioners v. FCC*, 525 F.2d 630, 636 (D.C. Cir.), *cert. denied*, 425 U.S. 992 (1976); *see also Telecator Network of America v. FCC*, 691 F.2d 525, 549 (D.C. Cir. 1982).

[67] *See, e.g., Amendment of Parts 2 and 22 of the Commission's Rules Relative to Cellular Communications System*, GN Docket Nos. 84-1231, 84-1233 & 84-1234, *Report and Order*, 2 FCC Rcd 1825, 1841 (1986), *recon denied*, 2 FCC Rcd 6830 (1987).

[68] *See Allocation of Spectrum Below 5 GHz Transferred from Federal Government Use*, ET Docket No. 94-32, *Second Report and Order*, 11 FCC Rcd 624 (1995).

30. We continue to believe that such broad allocations are permitted under the Communications Act, and we note that we also recently permitted CMRS licensees to provide fixed and mobile services.[69] The action we take here is consistent with this precedent. We note also that our service designation decision is not so broad as to allow use of the WCS frequencies for any purpose whatsoever. For example, the international allocation for part of this spectrum is for audio broadcast satellite services, and therefore satellite services will be limited to this type of satellite services.[70]

31. We disagree specifically with those commenters who assert that allocating these frequencies for fixed, mobile, radiolocation and audio broadcasting-satellite services is an impermissible allocation by auction or otherwise inconsistent with Section 309(j).[71] The allocation decision we make herein is based on our finding that under the circumstances presented, including the statutory deadline and the lack of a record that supports a specific allocation, this allocation to fixed, mobile, radiolocation, and audio broadcasting-satellite services comports with the public interest and with our statutory authority. Thus, our decision to allocate this spectrum in this manner is unrelated to our decision to award WCS licenses through competitive bidding.

32. In addition, we disagree with those commenters' arguments that by adopting our proposal we are impermissibly delegating our authority to allocate spectrum and set technical rules to other parties.[72] The allocation we make here is not entirely open-ended, and auction winners will be subject to strict technical rules that are necessary to prevent interference to other services and which also will likely limit the actual services they may be able to offer. As discussed *infra*, these technical rules are necessary to prevent interference. Therefore, we have not delegated to private parties our responsibility to allocate spectrum and adopt appropriate technical standards.

33. We also agree with commenters such as Lucent, Motorola, Nortel and CTIA who argue that economies of scale in equipment supply are important and recognize that our decision to adopt a flexible allocation may make achieving those economies of scale more difficult. However, we have taken several steps that we hope will assist licensees in achieving

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[69] *See Amendment of the Commission's Rules to Permit Flexible Service Offerings in the Commercial Mobile Radio Services*, WT Docket No. 96-6, *First Report and Order*, 11 FCC Rcd 8965 (rel. August 1, 1996).

[70] Other radio services that will not be permitted on WCS include, for example, direct broadcast satellite service (DBS), fixed-satellite service, terrestrial broadcasting services (other than "complimentary terrestrial broadcasting service" in support of satellite DARS operations), and mobile-satellite service.

[71] *See, e.g.*, TIA Comments at 5-6.

[72] *Id.* at 4.

economies of scale. For example, we have established relatively large geographic service areas and spectrum block sizes. We also are adopting licensing and auction rules designed to facilitate geographic area and spectrum aggregations that may foster economies of scale and, in developing their bidding and aggregation strategies, bidders can consider the benefits of such economies. We believe that our allocation and service rules adopted herein comply with all legal requirements and, considering the totality of the circumstances, serve the public interest.

34. We do not believe that the public interest will be served by prohibiting use of this spectrum for CMRS. It has been our consistent policy to actively seek to increase competition in telecommunications markets, and our decision here is consistent with that policy. Indeed, in the Omnibus Budget Reconciliation Act of 1993, Congress ordered the transfer of a large amount of government spectrum to our jurisdiction for nongovernmental use.[73] CMRS licensees have no reasonable basis to expect that we would limit the possibility of further entry by withholding spectrum or by unnecessarily restricting the permissible uses of newly allocated spectrum. However, we note that, given the out-of-band emission limits we adopt for WCS, technology will likely severely limit, if not preclude, most mobile services on this spectrum, at least in the near term.

35. Some commenters express concern with difficulties in controlling interference. We are responding to this concern by setting specific limits on field strength at the geographic boundaries between licensees and on emissions outside the assigned spectrum blocks. While we recognize that different system designs have different sensitivities to interference and cause different types and degrees of interference, we believe that these limits provide a reasonable degree of predictability as to the magnitude of interfering signals one can expect from adjacent areas and spectrum blocks. However, we recognize that these out-of-band and out-of-area power limits do not by themselves ensure interference-free operation. They control primary factors that determine the amount of interference a licensee can expect from neighboring areas and blocks, but there are many other factors that affect interference that they do not control and that are not under the receiver owner's direct control. For example, the level of interference caused to a licensee's receivers from transmitters in an adjacent spectrum block may also depend on the number of such transmitters, their location relative to the receivers, their antenna directivity and polarization, their duty cycle, and other factors. Since these factors are not regulated by the Commission, they create uncertainty about the amount of interference a licensee may receive. Licensees can reduce this uncertainty by coordinating with their neighbors, and we encourage them to do so. They also can reduce the risk of interference by properly designing and engineering their receiving systems and by using technologies that reduce their receivers' susceptibility to unwanted signals. Also,

[73] Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, 107 Stat. 312 (1993).

bidders can reduce their exposure to interfering signals from neighboring spectrum blocks or areas by aggregating adjoining licenses in the auction or through post-auction transactions. But again we emphasize that interference-free operation is not assured by our limits. Each WCS licensee must ultimately assume responsibility for protecting its own receiving system from interference from transmitters in adjoining blocks and areas that meet our limits, and applicants should understand this before they bid for these licenses.

36. Finally, in the *NPRM*, we proposed to permit amateurs to continue to use the 2305-2310 MHz band on a secondary basis. We also proposed to permit continued flight test and vehicle launch use of the 2310-2320 and 2345-2360 MHz bands on a secondary basis. We are adopting these proposals. The effect of this action is that amateurs and aeronautical telemetry operations will be able to continue to use these bands so long as these operations do not interfere with WCS service.[74] In addition, we update and clarify the frequency sharing requirements for amateur use of the 2300-2310 MHz and adjacent bands.[75] We also clarify that footnotes US276 and US339 permit the use of various frequencies for telemetering and associated telecommand operations of launch vehicles "on a co-equal basis by Government and non-Government stations."[76] With respect to Primosphere's request that all flight test operations be precluded from the WCS bands, we find no basis for precluding such operations on a secondary basis. We make clear that if secondary flight test operations cause harmful interference to WCS operations, they must immediately either correct the problem or cease operations. If such operations prove to be a problem, however, we may re-evaluate this issue in the future.

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[74] We refer parties to 47 C.F.R. § 2.104(d)(4), which requires that stations of a secondary service shall not cause harmful interference to stations of primary services to which frequencies are already assigned or to which frequencies may be assigned at a later date. Also, stations of a secondary service cannot claim protection from harmful interference from stations of a primary service to which frequencies are already assigned or may be assigned at a later date.

[75] Specifically, we update 47 C.F.R. § 97.303(j)(1) in order to inform the amateur community that amateur stations may not cause harmful interference to, nor are they protected from interference due to the operation of, mobile stations authorized in Region 1 (this is in addition to fixed operations). We also revise 47 C.F.R. § 97.303(j)(2) in order to better alert amateurs of their spectrum sharing responsibilities.

[76] The phrase "by Government and non-Government stations" was inadvertently dropped in the original publication of footnote US276 in the Code of Federal Regulations. *See* NTIA *Manual of Regulations & Procedures for Federal Radio Frequency Management*, September 1995 Edition (with Revisions for January and May 1996), page 4-110. In addition, we will list all requirements for the 2310-2320 and 2345-2360 MHz bands in footnote US339 and therefore have moved the requirement that satellite DARS operations during implementation should take cognizance of launch frequencies 2312.5 and 2352.5 MHz from footnote US328.

2. Spectrum for Each License

37. *Background.* In the *NPRM*, we requested comment on the appropriate amount of spectrum to be provided for each WCS license at 2.3 GHz. We specifically requested comment on whether 5, 10, 15 or 30 MHz is the most suitable amount. We noted that 5 MHz bandwidths would be sufficient for paging, radiolocation, dispatch, or point-to-point backbone operations. We also observed that larger bandwidths, such as 10 to 15 MHz, would allow more direct competition with existing fixed and mobile service providers and may also better support some multi-channel satellite DARS. We also asked for comment on whether a single 30 MHz license would offer the most effective approach for providing new two-way fixed or point-to-multipoint uses, such as interconnection with the Internet and other digital network services. Finally, we requested comment on what size spectrum block could best support, in part or fully, the provision of fixed local loop services.

38. We also sought comment on whether the WCS spectrum should be assigned on a paired or unpaired basis. Alternatively, we requested comment on an approach where spectrum bandwidths or pairing of the spectrum are determined through the competitive bidding process. We noted that the 30 MHz of spectrum could be divided into 5 MHz blocks and the amount of spectrum and the location of the spectrum (*i.e.*, contiguous or paired) for each WCS licensee could be determined through the auction process. We further invited commenting parties to suggest additional alternatives for both the amount of spectrum and the size of service areas for WCS licensees. We noted that the Appropriations Act requires that we conclude initial licensing of this spectrum and the collection of all bidding proceeds no later than September 30, 1997. We stated our belief that licensing the WCS spectrum for service to large areas, with relatively few licenses to be awarded, would speed the WCS licensing process and the collection of bidding proceeds, consistent with the requirements of the Appropriations Act. Whatever initial licensing approach is chosen for WCS, we proposed to permit spectrum and service area aggregation through the auction process, *e.g.*, we would permit parties to bid for more than one license in each geographic area and for multiple areas.

39. *Comments.* We received extensive comments addressing how this spectrum should be licensed for WCS services. The commenting parties suggest a broad range of options for licensing WCS, from a single 30 MHz license to licenses as small as 1 MHz. Of these options, the proposal to divide the spectrum into three 10 MHz (two 5 MHz paired) channels received a significant amount of support from the commenting parties. These commenters support a 10 MHz channeling plan because: (1) it would allow for the widest range of spectrum use;[77] and (2) 10 MHz is the minimum amount of spectrum needed to

[77] *See* Bellcore Comments at 3; GTE Comments at 5.

compete effectively and provide certain types of services, such as portable Internet access.[78] Pocket supports a 10 MHz channeling plan on the basis that small blocks of spectrum of no more than 10 MHz would be the most flexible channeling approach, permitting operators to bid for no more than the amount of spectrum they need.[79] Some of these commenters also explicitly support use of paired channels. They contend that pairing would accommodate both the provision of two-way data services and of wireless local loop and other voice applications over WCS spectrum.[80] In addition, PPF argues that the use of paired frequency bands generally will increase the range, reduce the cost and improve the outdoor service quality of terrestrial WCS systems.[81]

40. A number of other commenters support licensing WCS spectrum as six 5 MHz unpaired channels.[82] ALLTEL, for example, states that a band plan based on 5 MHz unpaired channels would facilitate the ability of entities to acquire the amount of spectrum most appropriate for their service offerings.[83] Under a flexible use approach, DSBC contends that the best course for ensuring efficient use of WCS spectrum is to distribute the spectrum in small blocks, thereby allowing licensees maximum flexibility to determine the best use of the spectrum.[84] Similarly, Sprint PCS/Sprint states that, to ensure that the market can effectively determine efficient usage for WCS spectrum, WCS should be licensed in 5 MHz blocks.[85] Sprint PCS/Sprint argues that initial licensing of larger spectrum blocks would discourage service innovation and efficient utilization, and would undercut the significant strides the Commission has made in encouraging a robust, competitive CMRS industry. NABOB states that it is much easier to "cure" an underassignment of spectrum than an overassignment in the auction. Further, NABOB argues that 5 MHz channels can be aggregated to create larger frequency blocks if desired, but that the allocation of channels larger than 5 MHz will preclude many minority-owned small businesses from participating in the competitive bidding

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[78] DigiVox Comments at 3; Bellcore Comments at 3; PCIA Comments at 9 and Reply Comments at 8; PPF Comments at 3-4.

[79] Pocket Comments at 2.

[80] PCIA Comments at 9 and Reply Comments at 8; Bellcore Comments at 3; PRTC Comments at 4.

[81] PPF Comments at 3-4.

[82] *See, e.g.*, AirTouch Comments at 9; Multipoint Comments at 2.

[83] ALLTEL Comments at 4.

[84] DSBC Comments at 8 and n. 16.

[85] Sprint PCS/Sprint Comments at 5.

process and possibly from the provision of WCS.[86] PrimeCo asserts that 5 MHz channels would allow a greater number of potential licensees to participate in WCS than any of the other amounts proposed in the *NPRM*.[87] In this regard, PrimeCo states that, in the PCS docket, it was noted that a 5 MHz block and the use of digital technology could provide twice the capacity of current analog cellular systems. It further states that 5 MHz is more than twice the total amount of spectrum available for the entire narrowband PCS service and is equal to the amount of spectrum currently available for the entire 900 MHz SMR service.

41. Several commenters support the initial licensing of the WCS spectrum in a single 30 MHz block.[88] APT and Markle support earmarking the WCS spectrum for a nationwide wireless data service and state that WCS licenses should either be for the entire 30 MHz of spectrum or that there should be two 15 MHz unpaired licenses, with the market determining whether they are paired or unpaired.[89] MCI and SOSCO state that a single 30 MHz license is the minimum bandwidth capable of delivering a wide range of digital services, from "wireline" quality voice to high-speed Internet access services.[90] MCI notes that 30 MHz would provide rough parity with the Block A, B, and C broadband PCS licensees and with cellular licensees. MCI and DSC contend that, in order to maximize the potential value of WCS for wireless services, as well as to stimulate direct competition to existing fixed and mobile services, the Commission should avoid dividing the spectrum into smaller frequency blocks.[91] In addition, Markle argues that dividing the spectrum into small slivers would violate Section 706 of the Telecommunications Act of 1996, which requires the Commission to encourage the deployment of advanced telecommunications capabilities to all Americans, and that small spectrum blocks would improperly pose a large barrier to investment and competition.[92] SOSCO also states that in the Gulf of Mexico, where the target population is almost entirely industrial, potential WCS licensees may decide not to make the enormous

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[86] NABOB Reply Comments at 3.

[87] PrimeCo Comments at 11-12.

[88] *See, e.g.*, GTA Comments at 2.

[89] APT Reply Comments at 2, 4; Markle Comments at 1. Markle states that this nationwide data service would be able to serve mobile users at pedestrian speeds, not vehicular speeds. The nationwide data service would advance education interests and promote health care efficiencies (goals of the Telecom Act of 1996), and facilitate a nationwide electronic mail ("e-mail") system. Markle believes that e-mail is the critical first entry point to participation in electronic communities for the majority of individuals.

[90] *See* MCI *Ex Parte* Presentation, December 19, 1996, at 8; SOSCO Comments at 8-9.

[91] *Id.*; DSC Comments at 3-4.

[92] Markle Comments at 9.

investment necessary to provide service unless there is sufficient bandwidth to provide the full array of advanced services required by the large, sophisticated businesses present in the Gulf.[93]

42. In addition, there is limited support for various other bandplans.[94] For example, Comcast and Vanguard recommend that the WCS spectrum be assigned in two 15 MHz blocks in order to maximize the potential services that can be offered by licensees.[95] Four parties propose their own bandplans: (1) BellSouth -- one 3 + 3 MHz block and two 6 + 6 MHz blocks;[96] (2) ADC -- three 5 MHz and one 15 MHz unpaired blocks;[97] (3) Omnipoint -- two 5 MHz, two 4 MHz, two 3 MHz, two 2 MHz, and two 1 MHz unpaired blocks;[98] and (4) Sun Microsystems -- five 1 + 1 MHz blocks and two 5 + 5 MHz blocks.[99]

43. Finally, Motorola and ROC raise additional issues concerning channelization of the WCS spectrum. Specifically, Motorola recommends that we allocate 8 + 8 MHz of the WCS band for public safety fixed point-to-point operations, which would provide ten 800 + 800 kHz channels for use in a frequency coordinated manner.[100] ROC requests that two 500 kHz nationwide licenses in the 2345-2360 MHz band be allocated for DARS interactive response links.[101]

44. After the comment period in this proceeding closed, several commenters submitted proposed band plans that they argue would mitigate the effects of the out-of-band emission

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[93] SOSCO Comments at 9.

[94] BANM merely states that blocks smaller than 30 MHz are clearly better for licensing since their use would assist in the dissemination of licenses among a wide variety of applicants, but does not specifically state what size blocks it prefers. BANM Comments at 8.

[95] Comcast Reply Comments at 3; Vanguard Comments at 5. *See also* APT Reply Comments at 2, 4.

[96] BellSouth Comments at 8-9.

[97] ADC Comments at 5, 17-18.

[98] Omnipoint Comments at 7 and attached Diagram.

[99] Sun Microsystems Comments at 2.

[100] Motorola Comments at 11. Motorola states that existing equipment at 2.2 GHz uses 800 kHz channels.

[101] ROC Comments at 1-3. These links would enable listeners to respond to DARS program material, for example, to order or request information concerning products or services marketed over DARS and also to respond to surveys. ROC states that 500 kHz per service provider is the minimum bandwidth needed to permit interactive DARS operators to compete effectively.

limits discussed in Section III.D.7, *infra*, required to protect satellite DARS reception in the 2320-2345 MHz band. Specifically, in its January 10, 1997 filing, Primosphere points out the unique circumstances of a satellite receive band "sandwiched" between two bands proposed for terrestrial services, including possible mobile service. Primosphere suggests that among the various technical and operational feasible means by which WCS licensees could achieve the necessary protection for satellite DARS reception is spectrum planning (such as prohibiting mobile transmissions in the 5 MHz adjacent to the satellite DARS band). Primosphere suggests that a possible frequency plan is three 10 MHz paired channels with a uniform transmit and receive separation.[102] Lucent agrees with Primosphere that the WCS spectrum with satellite DARS in the middle of the band is unique to spectrum management and represents some extraordinary technical challenges. Lucent recommends that the WCS spectrum be initially offered as two 10 MHz paired channels (2305-2310 MHz paired with 2350-2355 MHz and 2310-2315 MHz paired with 2355-2360 MHz) and two 5 MHz unpaired channels (2315-2320 MHz and 2345-2350 MHz).[103]

45. *Decision.* We observe that the commenting parties generally support either 5 MHz unpaired channel blocks or 10 MHz paired channel blocks, with the vast majority finding that at least 10 MHz is needed to provide certain WCS services in an efficient and competitive manner.[104] We note, however, that the potential uses of the WCS spectrum will be greatly affected by the out-of-band emission limits, discussed in Section III.D.7 *infra*, needed to protect satellite DARS reception in the 2320-2345 MHz band. In particular, these limits will have the greatest impact on the portion of the WCS spectrum immediately adjacent to the satellite DARS band, namely, the WCS spectrum at 2315-2320 MHz and 2345-2350 MHz. In order to account for this effect in light of the overall record of this proceeding, and to minimize its impact on WCS operations generally, we find that WCS should be licensed initially as two 10 MHz channel blocks (with 5 MHz of this spectrum from the lower band paired with 5 MHz from the upper band) plus two 5 MHz blocks (those immediately adjacent to the satellite DARS spectrum). We believe that this channelization will permit WCS licensees to offer a wide variety of services. For example, the record suggests that the 10 MHz channel blocks represent the minimum amount of spectrum needed to support certain

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[102] *See* Primosphere *Ex Parte* Filing, January 10, 1997, at page 9; Primosphere *Ex Parte* Filing, January 13, 1997, at figure 2.

[103] *See* Lucent *Ex Parte* Filing, January 13, 1997, at 1. This is the same bandplan that Hughes Network Systems proposed to DigiVox and which Siemens Stomberg-Carlson also supports. *See* DigiVox *Ex Parte* Filing, February 5, 1997, at Attachments 2 and 5, respectively.

[104] We note that many of those parties who suggested smaller channelizations also suggested that some channel blocks should encompass at least 10 MHz of spectrum.

data and wireless local loop services, including wireless Internet access.[105] In addition, we believe that providing for 10 MHz of spectrum on a paired basis would allow for the introduction of both one-way and two-way services and would facilitate the implementation of a variety of technologies. In the spectrum adjacent to the satellite DARS band, however, we believe that WCS mobile operations may be prohibitively expensive and technologically infeasible for a substantial period of time. Also, the narrow (*i.e.*, 30 MHz) transmit and receive separation between the 2315-2320 MHz and 2345-2350 MHz bands would substantially increase the cost of equipment employing traditional frequency division duplex technology if pairing of these blocks were required. By making this spectrum available initially to WCS licensees as two 5 MHz unpaired channel blocks, the spectrum may have increased utility for satellite DARS and a variety of WCS fixed operations, especially those employing time division duplex technology. Also, we will not preclude WCS licensees from pairing this spectrum on their own initiative, whether through submission of winning bids for each block at auction or through spectrum aggregation in the aftermarket. Another advantage of this overall initial licensing approach is that the offering of only four licenses in each service area will allow the WCS auction to be completed within the timetable contemplated by the Appropriations Act. In this respect, we believe that this licensing plan is superior to other options suggested by the commenters that would involve greater licensing complexity and probably greater delay. The initial channel blocks we have selected are shown in the Table below.

Channel Block	Frequency Range
A	2305-2310 and 2350-2355 MHz
B	2310-2315 and 2355-2360 MHz
C	2315-2320 MHz
D	2345-2350 MHz

46. As discussed in Section III.D.3., *infra*, we also are allowing for spectrum aggregation and disaggregation, without restriction, so that parties, for example, desiring to employ technology that requires unpaired spectrum or asymmetrically paired spectrum can either disaggregate the channels initially offered or purchase additional needed amounts of spectrum in the after-market. In addition, applicants may bid on all four channel blocks in a service area and, if successful, render the type of services addressed by those commenters supporting the licensing of WCS spectrum in a single 30 MHz block. Thus, the initial offering of WCS spectrum in 5 MHz or 10 MHz blocks does not preclude the offering of

[105] *See, e.g.*, DigiVox Comments at 3.

services which might require a greater amount of spectrum. Further, the disaggregation flexibility afforded licensees potentially allows provision of WCS services which require less spectrum than contained in the initial blocks. In sum, initially licensing the WCS spectrum according to the channel block plan identified above and allowing for spectrum aggregation and disaggregation will permit a wide variety of applicants to provide services and satisfy the requirements of the Appropriations Act. We also believe that providing for four blocks, along with our spectrum disaggregation rules, will promote the objectives of Section 309(j)(4)(C) of the Communications Act by providing for distribution of licenses and services among geographic areas and providing greater opportunity for a wide variety of applicants, including small businesses and other designated entities, than would be possible under a single 30 MHz block plan.

3. Licensed Service Areas

47. *Background.* In the *NPRM*, we stated our belief that licensing WCS spectrum on the basis of large geographic service areas would facilitate operation of the broadest possible range of new communications services in the spectrum and would promote their introduction in the most rapid and efficient manner. We noted that nationwide licensing would facilitate nationwide roaming and interoperability and allow for maximum economies of scale, and requested comment on the appropriate size for WCS licenses. Specifically, we asked whether WCS should be licensed on the basis of the 51 Major Trading Areas ("MTAs") defined for the narrowband and broadband Personal Communications Services ("PCS"),[106] regional service areas similar to the 5 regions adopted for narrowband PCS,[107] or on a nationwide basis.

48. *Comments.* The record reflects a wide variety of suggested service area definitions, ranging from nationwide licensing to licensing on the basis of the Metropolitan Statistical Areas (MSAs) and Rural Service Areas (RSAs) used for cellular licensing. Some commenters base their suggestions for the geographic scope of WCS licenses on what they perceive to be the likely use of WCS spectrum. For example, APT and Markle support licensing WCS on a nationwide basis because doing so would facilitate creation of a nationwide wireless data network.[108] APT suggests that such a network would further the

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[106] Rand McNally & Company ("Rand McNally") has divided the 50 States and the District of Columbia into 47 MTAs. *See* Rand McNally 1992 Commercial Atlas & Marketing Guide at pages 38-39 (123rd edition). The Commission added four additional MTA-like areas for licensing PCS.

[107] The five regional narrowband PCS service areas were developed by aggregating MTAs into five geographic areas, each with approximately twenty percent of the nation's population. The five regions defined for narrowband PCS licenses are set forth in 47 C.F.R. § 24.102(b). *See Memorandum Opinion and Order* in GN Docket No. 90-314 and ET Docket No. 92-100, 9 FCC Rcd 1309, 1310-1312 (1994).

[108] Markle Comments at 8; APT Reply Comments at 2-3.